UNPUBLISHED
SURVEY & CONTROL
REPORTS

INTERMOUNTAIN STATION
Central Reference File
No. 3.4163-31

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

STATION MEMORANDUM

Re: The Infestation of the Engelmann Spruce Beetle in Engelmann Spruce in the Vicinity of Yellowstone Park

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November 1937

U. S. GOVERNMENT PRINTING OFFICE: 1938 J 76133

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Gibson Nov. 1937

Station Memorandum

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The objective of this examination was to determine the boundaries of the Engelmann spruce beetle infestation which was known to be quite heavy in the north and northwestern parts of the Yellowstone Park.

BEAVERHEAD FOREST

Vipond Park -- Sixteen acres of strip in a heavy stand showing 10 percent Engelmann spruce composition failed to show any infestation in that timber species.

Wise River -- Inspection of Engelmann spruce along the road from the Lacey Creek Ranger Station to Wise River failed to reveal any Engelmann spruce beetle infestation.

Birch Creek -- Near Boot Lake two Engelmann spruce attacked by the Engelmann spruce beetle were found after examination of a large area. This indicates a very light (and probably endemic) infestation of that insect.

Gravelly Range -- No infestation was noted in Engelmann spruce on two widely separated areas along the Ruby-Madison River divides.

West Fork of Madison River -- A light (slightly increasing) infestation was found in the Engelmann spruce scattered along the stream bottom. Nine acres revealed one pitched-out and one successfully attacked tree by the beetle. Secondary bark beetles, however, were killing more trees than the Engelmann spruce beetle. A count showed that both agencies had killed 49 out of 500 trees in the last few years, or about 10 percent of the stand.

GALLATIN FOREST

Beaver Creek -- Fifteen acres of stream bottom type Engelmann

spruce contained 8 heavily and 2 lightly attacked trees. About 20 percent of the spruce had been killed, but secondary bark beetles and change in site conditions due to a shifting stream bed can be credited with some of this loss. Infestation by the Engelmann spruce beetle does seem, however, to have increased in 1937.

Denny Creek -- Only a very light infestation was noted in the lower part of Denny Creek in the Engelmann spruce, but Supervisor Whittam reports that 25 percent of the Engelmann spruce has been killed in the timber sale areas at the head of this ~~creek.~~ drainage.

Grayling Creek -- In the stream-bottom type along the Bozeman-West Yellowstone Road the infestation is active and has destroyed about 50 percent of the stand. Hillside type has shown a much heavier loss and a four-acre area showed 90 percent of the trees dead. The infestation is now very light probably as a result of the resistance to attack offered by the remaining trees which are of small diameter. The condition of the dead trees indicates the infestation has been present a number of years.

Bacon Rind Creek -- A strip one mile north of Bacon Rind Creek (part of the upper Gallatin River drainage) running from the river level to the ridge top showed a previously heavy, now declining, infestation in Engelmann spruce. The larger trees have been killed and the remaining ones are of smaller diameter which seem to offer greater resistance to attack and development of bark beetle brood. At present the infestation amounts to about .4 of a tree per acre, but 25 percent of the trees attacked in 1937 were too lightly ~~infested~~ attacked to cause the death of the tree.

Cache Creek -- This drainage on the large Taylor Fork watershed showed only a very light (and probably endemic) infestation in Engelmann spruce. It only amounts to about .02 of a tree per acre and only 2 to 3 percent of the spruce had been killed by insects.

Daly Creek -- This drainage in the northwest corner of Yellowstone Park and but 13 miles east of the Cache Creek area showed an infestation of .44 tree per acre and indications that there were an even heavier kill had occurred on the drainage south of the one examined.

Specimen Creek -- This area, only four miles southeast of the Daly Creek drainage, showed a very heavy infestation and previous kill. The present infestation is about 2.06 trees per acre, and from 50 to 90 percent of the Engelmann spruce, where it occurs in groups, had been killed. Where individual Engelmann spruce are scattered throughout the lodgepole pine stand, their comparative isolation seems to have resulted in a much lower proportion being attacked. ~~is much lower.~~

Porcupine Creek -- The area examined on this drainage was 12 miles northeast of the Cache Creek and 11 miles northwest of the Daly Creek areas. The infestation is quite heavy on this area--.5 trees per acre--but does not seem to have been present as long as on the Specimen Creek drainage.

ABSAROKA FOREST

Tom Miner Creek -- Over a high divide and seven miles to the north of the Specimen Creek area an extremely heavy infestation was noted in Engelmann spruce (on the Tom Miner Creek drainage). On 38 acres of strip about 1.1 trees of a total stand of Engelmann spruce of 10.9 trees per acre were found attacked or about 10 percent of the stand. The infestation prior to 1937 had been quite light. Of the attacked t

1937 had been quite light. Of the attacked trees, however, about 40 percent had "pitched-out" the 1937 attacks.

Six Mile Creek -- This drainage 17 miles northeast of the area examined on Tom Miner Creek (and across the Yellowstone River) showed only a light infestation in the Engelmann spruce along the stream bottom.

Mill Creek -- This area, which is ten miles east and slightly north of the Six Mile Creek area, also shows merely a light infestation in the stream bottom Engelmann spruce type, the only type the limited available time permitted the examination of.

Mission Creek -- Mill Fork of this creek, about ~~ten~~ 10 miles southeast of Livingston, Montana and about 23 miles north and slightly east of the Mill Creek area, also shows only a light infestation in Engelmann spruce. Most of the type was stream bottom but some higher type was examined. Although light, the infestation on this drainage is more active than on Mill and Six Mile Creek and has resulted in about 10 percent of the stand being killed in recent years.

GALLATIN FOREST

Squaw Creek -- On 12.3 acres 11 infested Engelmann spruce were observed, thus averaging (about) .9 per acre, a heavy infestation. It is not believed, however, that as heavy an infestation as this actually exists over the area as a whole. (Also) The data secured shows about 40 percent of the 1937 attacks to be unsuccessful. ~~Also~~ The trees killed in 1936 averaged only 50 percent of those attacked in 1937, with only scattering trees killed prior to 1936.

The Squaw Creek area is approximately 37 miles southwest of the Mission Creek area, placing it much nearer the heavy infestation near the Yellowstone Park. Furthermore, it is on the slopes of the Gallatin Range between the Gallatin and Yellowstone Rivers along which the infestation seems to be quite heavily concentrated.

Hell-Roaring Creek -- The preceding statement is at least partially confirmed by the finding of no infestation on Hell-Roaring Creek about nine miles west of and on the slope of the Madison Range. The Madison Range divides the Gallatin and Madison River watersheds.

Jack Creek -- On this drainage 14 miles west and slightly south of the Hell-Roaring Creek area the Engelmann spruce beetle infestation averages only .06 trees per acre and two-thirds of the trees infested had been hit two years before being killed by the beetles.

DISCUSSION

The absence of infestation on the Cache Creek area, only 12 miles west of the heavily hit Daly Creek drainage and only 20 miles northwest of Grayling Creek, where the Engelmann spruce beetle has not only destroyed the greater part of the stand after being active probably 5 or 6 years but is no longer present on the area, is difficult to understand. The observations on the Cache Creek watershed are believed to be representative, however, due to the comparatively large amount of strip run and the quite large area which showed no visual indications of beetle activity. In addition the Hell-Roaring Creek observations show no evidence of an active Engelmann

spruce beetle infestation, and the same may be said of the Jack Creek drainage on the west side of the Madison Range. If these three areas may be considered representative there is no active Engelmann spruce beetle infestation on the west side of the Gallatin River north of the Taylor Fork.

On the east side of the Gallatin River the infestation decreases from heavy to 15 miles north of the Yellowstone Park boundary to medium on the Squaw Creek drainage. Data was not secured on the east side of the Gallatin Range north of Tom Miner Creek, but it is assumed that the conditions on Squaw Creek on the east side are representative.

East of the Yellowstone River only a light infestation was noted. The Mission Creek area, though, showed a much more aggressive infestation than was found on the two areas farther to the south. An unusual feature of the Mission Creek infestation was the finding of much of the brood overwintering in the new adult stage instead of the larval stage noted on the other areas.

To show the conditions in a more condensed form the tabulation which follows is submitted.

Report on the Engelmann Spruce Beetle Infestation in the Vicinity of the Yellowstone National Park.

Infestation on the Beaverhead National Forest

Area	Amount of Infestation	Trees per Acre	(1) Percent Stand Killed	Remarks
Vipond Park	None	None	None	—
Wise River	None	None	None	—
Birch Creek	Very light	.02	None	Probably endemic
Gravelly Range	None	None	None	None
West Fork of Madison River	Light	.22	10	One unsuc. att. in 37. Secondary bark-beetles killing more than E.S. beetle.

Infestation on the Gallatin National Forest

Beaver Creek	Medium	.40	20	Same poor site. Secondary bark-beetles causing some loss. Increase in infestation in 1937
Denny Creek	Light	—	25	Stream bottom type
(2) Grayling Cr.	Medium	—	50	Hill side type
(2) Bacon Rind Cr.	Medium	.40	90	Declining infestation
Cache Cr.	Very light	.02	2 to 3	Probably endemic
(2) Daly Cr.	Medium	.44	—	—
(2) Specimen Cr.	Very heavy	2.06	50 to 90	Group loss heavy, fewer scattered trees attacked.
Porcupine Cr.	Heavy	.50	—	Increasing infestation
Squaw Cr.	Medium	.45	5	Increasing infestation
Hell Roaring	None	None	None	Only stream-bottom type examined.
Jack Creek	Light	.06	2 to 3	Probably endemic

Infestation on the Absaroka National Forest.

Tom Miner Cr.	Very heavy	1.1	5	Increasing infestation
Six Mile Cr.	Very light	—	Less than 5	Probably endemic
Mill Creek	Very light	—	Less than 5	Probably endemic
Mission Creek	Light	—	10	Heavy brood and increasing infestation.

Respectfully submitted,

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